Please replace the drawing sheet with Figures 7-10 with the enclosed replacement sheet.

REMARKS

In the Office Action, the Examiner noted a reference cited in the application and not on a 1449. An Information Disclosure Statement and 1449 are enclosed herewith.

The Examiner objected to the title. The title has been amended, but differently than suggested by the Examiner.

The abstract has been amended to reduce the number of words.

Row numbering has been added to Figure 10. Figure 10 and other figures clearly show the rows of claims 18-20.

The Examiner recommends a perspective view to show the Kerf features. Since Kerfs are well known and the top views of the figures show the claimed extent of the Kerfs, an additional figure is not believed to be needed.

The Examiner objected to claim 1 due to the use of ultrasound in the preamble and acoustic energy in the body of the claim. The preamble is amended for clarity.

The Examiner rejected claim 5 pursuant to 35 U.S.C. § 112, second paragraph, as indefinite. Uniform sensitivity to measure volume flow is a known technique (see page 2, lines 1-10 of the specification). Claim 5 is definite.

The Examiner rejected claims 1-3, 5, 6, 9-12, 14, 15, and 17 pursuant to 35 U.S.C. § 102(b) as anticipated by Fu, et al. (U.S. Patent No. 4,431,936). Claims 2 and 11 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Fu, et al. in view of Nudell, et al. (U.S. Patent No. 5,085,220). Claims 4 and 13 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Fu, et al. in view of Robinson, et al. (U.S. Patent No. 6,419,633). Claims 7 and 16 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Fu, et al. in view of Ma (U.S. Patent No. 6,599,245). Claims 8, 17, and 18 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Fu, et al. in view of Stephens (U.S. Application Publication No. 2004/0054287) and Robinson, et al. Claims 19 and 20 were rejected pursuant to 35 U.S.C. § 103(a) as unpatentable over Fu, et al. in view of Stephens and Robinson, et al.. Applicants respectfully request reconsideration of the rejections of claims 1-20, including independent claims 1, 3, 8, 9, and 18.

Independent claim 1 recites using elements from at least three rows of elements in an annular ring element and a center annular element for measuring volume flow and at least one of the rows for imaging, where the rows of elements are straight along an azimuth dimension and have rectangular elements. Independent claim 1 now includes the limitations of claim 6 with the further limitation that the rows be straight along the azimuth dimension and have rectangular elements.

The Examiner cited to col. 7, lines 5-14 and figure 10b of Fu, et al. Figure 10b shows one straight row, but two other rows with curved elements. Fu, et al. use an array designed to be an annular array with annular elements, so Fu, et al. do not suggest at least three straight rows having rectangular elements.

Independent claim 3 recites imaging by operating the array as a 1.5D array. The Examiner notes Fu, et al. do not disclose 1.5D array, but also notes that such arrays are known. Claim 3 was rejected as anticipated by Fu, et al., but Fu, et al. do not show all the limitations. The array of Fu, et al. may be steerable in elevation, so 1.5D operation is not inherent. Claim 3 is allowable.

Since Fu, et al. use the array as an annular array, annular steering is likely, not 1.5D steering. Fu, et al. even note operation of each element with independent amplitude and timing for steering (col. 4, lines 39-45). Fu, et al. teach independent element operation of an annular array, so a person of ordinary skill in the art would not have used 1.5D operation with the array of Fu, et al.

Independent claim 8 recites three rows having a first length, but a kerf extending in azimuth less than the first length. The Examiner relies on Stephens disclosure of kerf (paragraph 97). However, Stephens discloses kerfs extending the full length of the array of elements. The paragraph 97 discussion concerns whether to cut the flex circuit, not the piezoelectric elements, for acoustic isolation. The flex is cut fully in azimuth in Stephens. The extra, optional cut is for the ends of the array. Stephens does not disclose a kerf extending only partially along a row of elements in azimuth.

Independent claim 9 includes limitations similar to claim 1, but with four rows of elements and without the straight limitation. Fu, et al. show one linear row with two annular arrangements alleged to be rows by the Examiner (figure 10b). Fu, et al. do not suggest at least four rows of elements in a fully sampled NxM grid.

Independent claim 18 recites a kerf extending less than an azimuth length of the array. Claim 18 is allowable for the same reasons as claim 8.

The dependent claims depend from corresponding independent claims, so are allowable for the same reasons. Other dependent claims include limitations the same or similar to other independent claims, so are allowable for the same reasons (e.g., claim 17 is allowable for the same reasons as claim 8).

Further limitations patentably distinguish from the cited references. For example, claims 19 and 20 recite relative element sites. The Examiner notes the sparse array of Robinson and associated switching configuration, and then concludes that the possibility of structural configuration and thus the configuration would have been known to a person of ordinary skill in the art. However, a possibility does not suggest actual configuration. Electrical switching of a sparse array does not result in elements with the recital sizes. The switched elements are still the same size.

CONCLUSION:

Applicants respectfully submit that all of the pending claims are in condition for allowance and seeks early allowance thereof. If for any reason, the Examiner is unable to allow the application but believes that an interview would be helpful to resolve any issues, he is respectfully requested to call the undersigned at (650) 943-7554 or Craig Summerfield at (312) 321-4726.

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